

Coping with Uncertain Livelihoods in Mountains: Landless Mobile Pastoralists Adaptation to Climate Change in the Himalayan Hindukush Mountains of Northern Pakistan

**Henri Rueff, Centre for Development and Environment, University of Bern,
henri.rueff@cde.unibe.ch**

Inam ur Rahim, University of Central Asia, Inam.rahim@ucentralasia.org

The Landless Pastoralists' transhumant system in the Himalaya-Hindukush Mountains of Northern Pakistan (Hazara–Potohar and Buner–Swat regions) has reached a state of disequilibrium. Affected herders are increasingly vulnerable: they are directly threatened by climate change, yet have little means of coping with it. In the following paper, we will describe a unique pastoral system with herders, who – until twenty years ago – were able to adapt to climate change and variability mainly due to the exchange of services they had with farmers along transhuming routes. Today, changes in land use, cropping practices, and sources of livelihoods have disrupted this equilibrium, leading to growing vulnerability and poverty among landless herders.

The pasturing cycle of this system may be divided into four periods: a summer period (three months); a winter period (five to six months); an upward-movement period (two months); and a downward-movement period (two months). The winter period is spent in low-elevation (400 to 1000m) scrublands in the Buner, Peshawar valley, and Potohar. The summer period is spent in higher elevation (3000 to 4000m) upland pastures in Naran, Chorh, Indus Kohistan, Swat Kohistan, and Dir Kohistan. There are several resting places along the transhuming routes where herders range anywhere from a few hours to a few weeks depending on the availability of grazing resources and accessibility.

We will present the preliminary results of our ongoing research on this pastoral system, emphasising climate change adaptation and mitigation. In addition to analysing the processes that have made the system nearly unsustainable in recent years, we will discuss policy measures that could help return it to its former balanced state, capable of adapting to climate change and variability. Securing herders' periods of transhumance appears crucial: protecting the duration and timing of these periods enables herders to find adequate grazing options along the routes and benefits upland and lowland pastures. Longer transhuming periods allow pastures sufficient time to recover and prevent animals from grazing on new growth in the uplands. When the system is at equilibrium, herders may feed their animals stubble, staple crop residues found along the transhuming routes. Making their way towards upland pastures, herders encounter freshly harvested fields made available to them by farmers for stubble feeding. In return, herders' livestock deposit manure and fertilise the land. In such a process, herders have enough time for transhumance, have sufficient fodder along the way, and may adjust their arrival in upland pastures according to the annual variability of snowmelts and the availability of grasses. Today, new complications have arisen: transhuming routes are increasingly obstructed by afforestation projects off limits to herders; fields of cash crops have

replaced fields of staple crops, and herders are not allowed to traverse them. This forces herders to shorten their trek and arrive earlier at uplands, in turn exhausting pasture resources.

A holistic analysis of the system indicates that policy measures should secure the transhuming period on behalf of herders. Securing herders' routes and resting places allows upland pastures adequate recovery periods; herders may also leave lowland pastures earlier, further reducing the stress on pasture resources.

Turning to climate change mitigation, we will describe how adequate management of alpine pastures can transform them into carbon sinks for which herders receive payment. Rangeland management is gaining attention in connection with such mitigation activities (Tennigkeit and Wilkes 2008) – alpine pastures with a low rate of decomposition appear to bear great potential as carbon sinks, despite their relatively low production of biomass. The carbon market could be used to discourage cash cropping in favour of maintaining open pastures. Currently, the opposite is happening: landless herders in uplands seek to increase their income by planting cash crops on alpine pastures. This shift to cropping takes over pastures and exposes land to erosion. We are currently investigating the mitigation effect of reversing cropland to pasture land at different altitudes and slope aspects, while having cropping as a baseline. The model we develop should enable us to predict the mitigation effect of the reversal process and how it translates it into a per hectare payment.

Following our presentation of climate-change adaptation and mitigation options for this pastoral system, we will conclude by discussing the broader implications of maintaining this pastoral system – a system that provides important ecosystem services and food security to Pakistani society as a whole.

REFERENCES

Tennigkeit, Timm, and Andreas Wilkes, 2008. *Carbon Finance in Rangelands: An Assessment of Potential in Communal Rangelands*, World Initiative for Sustainable Pastoralism - IUCN